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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/662,819

09/16/2003

Hiroji Ebe

031171

1103

23850

7590

06/30/2004

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EXAMINER

FARAHANI, DANA

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 06/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/662,819

Applicant(s)

EBE ET AL.

Examiner

Dana Farahani

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang et al., hereinafter Wang (US Patent Application 2002/0119680).

Regarding claims 1-3, 7, 10, 11, and 13, Wang discloses in figure 7, a quantum optical semiconductor device, comprising a GaAs substrate 10; and an active layer 11 formed on the semiconductor substrate and including therein a quantum structure, the quantum structure comprising: a first barrier layer 12 of a first semiconductor crystal having a first lattice constant and a first bandgap; a second barrier layer 14 of a second semiconductor crystal formed on the first barrier layer, the second semiconductor crystal having a second lattice constant and a second bandgap; a plurality of quantum dots 13 formed in the second barrier layer, each of the quantum dots comprising a semiconductor crystal forming a strained system with regard to the first and second semiconductor crystal and having a lattice constant different from the first lattice constant and a bandgap smaller than any of the first and second bandgaps, each of the quantum dots having a height substantially identical with a thickness of the second

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barrier layer; and a third barrier layer, another layer of the plurality of layers 14 of a third semiconductor crystal formed on the second barrier layer, the third semiconductor crystal having a lattice constant different from the lattice constant of the semiconductor crystal constituting the quantum dot, the third semiconductor crystal further having a third bandgap larger than the bandgap of the semiconductor crystal forming the quantum dot (see page 4, paragraph 56), the third barrier layer making a contact with an apex of the quantum dot formed in the second barrier layer.

Regarding claims 4, 9, and 15, see paragraph 21.

Regarding claims 5 and 6, note that there is a lattice mismatch between second barrier layer 14 and the dots, and therefore, the strain upon on layer(s) 14 causes more Ga density in the vicinity of the dots.

Regarding claims 8 and 14, note that layers 14 can selectively be InP and GaAs, (paragraph 21) hence could have different lattice constants than layer 12 and/or among layers 14 themselves).

Regarding claim 12, there is a substrate electrode 19, and layer 16 could be an active layer and layer 11 could be the cladding layer, and 17 a second cladding layer.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang.

Regarding claim 16, Wang discloses the limitations in the claims, except for the composition ratio of InGaAsP. It would have been obvious to one of ordinary skill in the art at the time of the invention to appropriately select the ratio percentage of the components of this material, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use. *In re Leshin*, 125 USPQ 416.

Regarding claims 17-19, Wang discloses the limitations in the claims, as discussed above, but does not disclose the number of repetitious quantum dot layers and the barrier layers being 8. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose and select the appropriate number of the alternating layers 13 and 14, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F. 2d 272, 205 USPQ 215 (CCPA 1980).

Conclusion

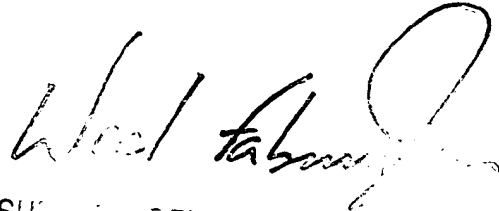
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (571)272-1706. The examiner can normally be reached on M-F 9:00AM - 6:00PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M Fahmy can be reached on (571)272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

D. Farahani


SUPERVISORY PRIMARY EXAMINER
TECHNOLOGY CENTER 1800